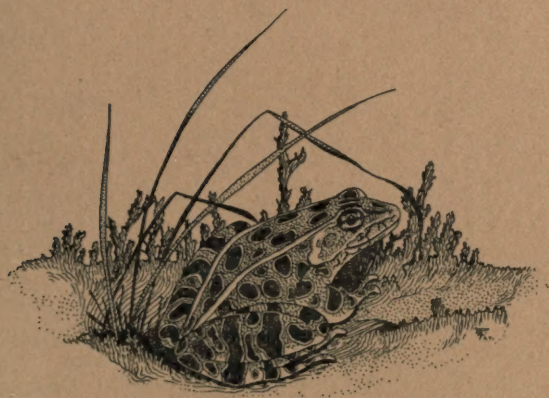


THE FROGS AND TOADS OF THE CHICAGO AREA

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ZOOLOGY
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The Zoological Leaflets of Field Museum are devoted to brief, non-technical accounts of the history, classification, distribution and life habits of animals, with especial reference to subjects shown in the Museum's exhibits.

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STEPHEN C. SIMMS DIRECTOR

FIELD MUSEUM OF NATURAL HISTORY
CHICAGO, U.S.A.



COLOR CHANGE IN THE COMMON TREE-FROG
 Drawn from a single specimen.

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DEPARTMENT OF ZOOLOGY

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Frogs and Toads of the Chicago Area

The "Chicago Area" may be defined as the area within fifty miles of the center of the city of Chicago. It includes a small corner of southeastern Wisconsin, larger sections of northeastern Illinois and northwestern Indiana, and a small segment of southwestern Michigan. The present account of the frogs and toads of this region forms one of a series of leaflets designed as introductions to the study of the local animals. It is hoped that resident naturalists will find them a useful basis for the much-needed detailed studies which still remain to be made.

In all of North America north of Mexico there are seventy-two different kinds (or species) of frogs and toads. Only eleven of these are found in the vicinity of Chicago. Of these eleven, two are true toads, five are true frogs, and the remaining four are tree frogs, or tree toads. It is a curious fact that there is no comprehensive English word which includes the frogs and toads and their allies, corresponding with the zoological group "Salientia." Salientia means leapers, which certainly indicates one of their most distinctive characters. The *order* Salientia, in turn, forms one of the subdivisions of the *class* Amphibia, which as a whole is intermediate between the fishes on one hand and the reptiles on the other. The body form of the frogs and toads, without a tail and with long hind limbs adapted for jumping or hopping, distinguishes them at a glance from their nearest relatives,

the salamanders (order Caudata). The living amphibians include a third order, the caecilians (order Apoda), which are limbless, wormlike, burrowing forms entirely confined to the tropics.

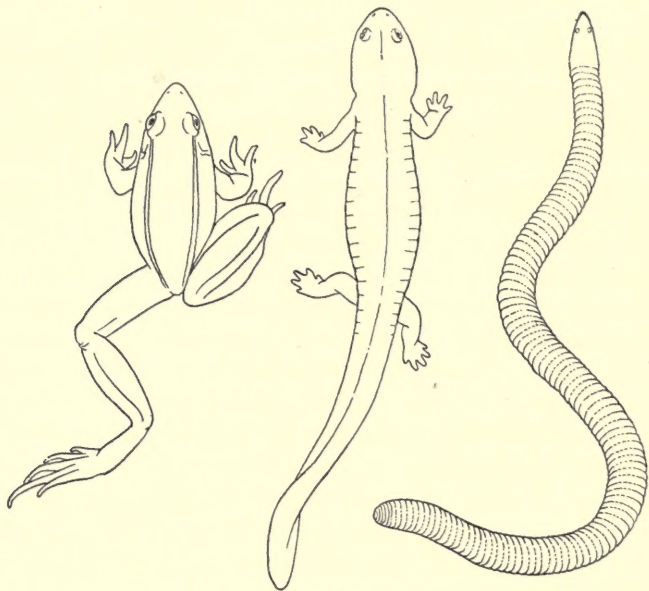


FIG. 1

A frog, a salamander, and a caecilian, illustrating the three orders of amphibians.

Unlike the reptiles, which are primarily land animals, the great majority of amphibians begin life with an aquatic stage, as tadpoles or larvae. All of the local species of frogs and toads deposit their eggs in water, and the young develop an aquatic tailed tadpole. They grow as tadpoles until they are ready to transform into the tailless land stage.

For a short time after hatching, the tailed and limbless larvae have branched external gills. They attach themselves to the jelly mass which enclosed their eggs, or to the surrounding vegetation, by means of a pair of suckers.

As the mouth develops its characteristic horny beak, the suckers are lost, and at the same time a fold of skin grows backward from the head and encloses the gills. Under this fold of skin the front limbs develop, and do not appear externally until they are fully formed and until the hind limbs are well advanced. The name tadpole should really be restricted to the period between the development of the gill pouch and the appearance of the front limbs. The rounded, limbless and gill-less fore part of the body distinguishes the frog tadpole from the early stages of the salamanders, which may be called larvae throughout their period of development.

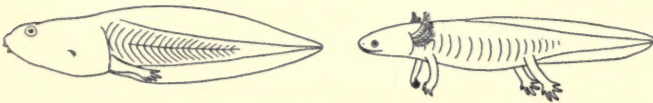


FIG. 2

A frog tadpole and a salamander larva.

The changes that take place at the time of transformation of the tadpole into the adult land stage are remarkable. The horny 'teeth' are lost and the true jaws and mouth developed; the tail is lost; the gills are lost; and most remarkable of all, the long coiled intestine of the plant-eating tadpole shrinks to a fourth of its length in the insectivorous adult frog.

Most adult amphibians require a considerable degree of moisture in their surroundings, and die at once in dry situations. The toads form a partial exception to this rule, and their horny and warty skin is an adaptation to decrease evaporation in the drier situations in which they live. The primary characteristic that marks the 'salientian' is the curious body form, which is especially adapted for a leaping mode of locomotion. The leaping powers are reduced in our toads, which have taken up a more or less subterranean existence. The more terrestrial true frogs are also good swimmers, and among them the

highest development of the webbed hind foot is found in the Green Frog and Bullfrog, the forms most closely confined to the water. The tree frogs represent an adaptation of the frog form for life in trees and bushes. They are enabled to climb by adhesive disks on the tips of their fingers and toes. These three groups—the toads, true frogs, and tree frogs—represent three of the nine existing families of frogs and toads.

There are eleven kinds of frogs, toads, and tree frogs common in the Chicago area, i.e. within fifty miles of the center of the city. Their names are:

THE TOAD FAMILY (*Bufonidae*)

1. Common Toad (*Bufo americanus*)
2. Fowler's Toad (*Bufo fowleri*)

THE TREE FROG FAMILY (*Hylidae*)

3. Common Tree Frog (*Hyla versicolor*)
4. Spring Peeper (*Hyla crucifer*)
5. Swamp Tree Frog (*Pseudacris triseriatus*)
6. Cricket Frog (*Acris gryllus*)

THE TRUE FROGS (*Ranidae*)

7. Leopard Frog (*Rana pipiens*)
8. Pickerel Frog (*Rana palustris*)
9. Wood Frog (*Rana cantabrigensis*)
10. Green Frog (*Rana clamitans*)
11. Bullfrog (*Rana catesbeiana*)

Besides these, there are old records of the occurrence of the Crayfish Frog (*Rana areolata*) in northern Illinois and Indiana, and there is a possibility that the southern form of the leopard frog (*Rana sphenoccephala*) reaches the southwestern border of our area. The common forms may be distinguished by means of the figures in this leaflet, any doubtful cases being checked with the de-



TRUE TOADS OF THE CHICAGO AREA
 a. The Common Toad. b. Fowler's Toad.

scriptions of the individual forms. These figures, together with the color plate illustrating color change in the common tree frog, are the work of Mr. L. L. Pray, of the taxidermy staff of Field Museum of Natural History. The figures have been grouped to show the related forms together for comparison; the toad family in plate II, the tree-frog family in plate III, and the true frog family in plate IV.

The flash-light photograph of the Swamp Tree Frog singing with its throat fully distended (plate V) was taken by Mr. C. J. Albrecht, also of Field Museum's taxidermy staff. It is unusual in showing the approach of the female to the calling male, (compare Overton in bibliography at end).

KEY TO THE FROGS AND TOADS OF THE CHICAGO AREA

A. Skin very rough or 'warty,' with a pair of oblong swollen glands on the shoulders; head with bony ridges. (Family Bufonidae), plate II.

B. Dark spots on back usually enclosing a single wart; crosswise bony ridges behind the eyes connected with the shoulder glands by short backward spurs.

Common Toad (*Bufo americanus*).

BB. Dark spots on back usually enclosing three or more warts; crosswise ridges touching the front edges of the glands.

Fowler's Toad (*Bufo fowleri*).

AA. Skin smooth or nearly so; no special glands on the shoulders; head without bony ridges.

B. Tips of fingers and toes with expanded adhesive disks. (The disks are small in two forms and careful attention is required to distinguish them). (Family Hylidae), plate III.

C. Finger disks about twice as wide as the finger.

D. Size small, color brownish, a dark X on the back.

Spring Peeper (*Hyla crucifer*).

DD. Size moderate, color green or gray with darker markings; a white mark below the eye.

Common Tree Frog (*Hyla versicolor*).

CC. Disks of fingers no wider than the finger itself; size very small.

D. Toes without webs; three dark brown stripes down the back.

Swamp Tree Frog (*Pseudacris triseriatus*).

DD. Toes with well-developed webs; a triangular dark mark between the eyes.

Cricket Frog (*Acris gryllus*).

BB. Tips of fingers and toes pointed, without trace of disks. (Family Ranidae), plate IV.

C. No raised glandular fold along the sides of the back.

Bullfrog (*Rana catesbeiana*).

CC. A pair of glandular folds from behind the eyes along each side of the back.

D. Large dark spots on the back.

E. Spots rounded, thighs not yellow.

Leopard Frog (*Rana pipiens*).

EE. Spots squarish, thighs yellow or orange on concealed surfaces.

Pickerel Frog (*Rana palustris*).



TREE-FROGS OF THE CHICAGO AREA

- a The Common Tree Frog. b. The Spring Peeper. c. The Swamp Tree Frog.
d. The Cricket Frog.

DD. Back without large spots.

E. Color green; no black on cheeks.

Green Frog (*Rana clamitans*).

EE. Color brown; cheeks black.

Wood Frog (*Rana cantabrigensis*).

COMMON TOAD (*Bufo americanus*)

Everywhere in North America, as well as in Europe and Asia, there is a toad which is referred to as "the common toad." The Common Toad of the Chicago area belongs to a species which ranges from Labrador to Minnesota and south as far as Missouri and North Carolina.

This toad is a useful animal, at home in gardens and cultivated fields, where it feeds on the most abundant insects, which, in these situations, are likely to be pests. It is an ugly creature in common parlance, but to anyone who views its gravely comical behavior in a friendly spirit the word "ugly" seems singularly out of place.

In the spring the toad migrates from its hibernation quarters to a nearby pond or marsh. Here the males set up a chorus whose high-pitched musical trill can be heard to great distances (probably at least a mile). Mating usually takes place promptly and the chorus is over after a few nights. The eggs are laid in cylindrical strings of gelatin, a character which distinguishes them sharply from the eggs of the frogs and tree frogs. The development of the young is rapid and the tadpoles transform into tiny black toadlets averaging only two-fifths of an inch in length, leaving the water within about two months of the date of egg-laying.

The common belief that the handling of toads may cause warts is wholly without foundation. It has evidently arisen from the simple analogy between the wartiness

of toads and the existence of warts on the hands of small boys. The 'warts' of the toad's skin of course bear no relation to the warts to which the human skin is subject. The skin of toads does secrete a poison, which is a violent irritant to the mouth and eyes, but not to the skin of man. This poison probably protects the toad from some of its enemies. Dogs, at any rate, usually learn to leave them alone after a single trial. Some snakes, unfortunately, are immune to the toad-poison, and are the worst enemies of this harmless and useful animal.

A second widespread belief about toads is that they are found living imprisoned in solid wood or rock. This belief seems to be founded on actual finds of toads in curious situations. The toad's habit of backing down crevices, especially to hibernate, seems adequate to account for the reports of imprisoned toads. A small toad spent the winter in a crevice between the concrete floor and stone wall of the basement of the writer's house some years ago. Toads have a horny tubercle at the heel by means of which they burrow into the ground. The body moves backward as the limbs push the dirt out of the way.

FOWLER'S TOAD (*Bufo fowleri*)

The occurrence of a second species of toad in eastern North America, sometimes in the same localities with the Common Toad, has been an interesting subject of discussion in museum circles since 1907, the time of publication of Miss Dickerson's *Frog Book*. Little by little naturalists have learned to distinguish this form from the common one, though occasional specimens seem to be really intermediate. The two were long confused, and it has only lately become evident that the second species is really more widely distributed than the first.

Fowler's Toad in this locality can usually be recognized by its paler color; having the dark spots on the back

larger and the warts smaller, usually with three or four warts in a single spot; and by the fact that the large gland on the shoulder (the parotid gland) touches the crosswise bony crests behind the eyes.

Its distribution is strikingly different from that of the Common Toad. It is rather strictly confined to sandy areas in the Chicago region. It is the abundant toad of the Indiana dunes, and occurs again at Beach, north of Waukegan. There is no doubt that it ranges into Wisconsin along the shore of Lake Michigan, though it has not yet been recorded from that state.

The Fowler's Toads come out of hibernation much later, and lay their eggs much later, than do the common toads. One of the most striking differences between the two species lies in their voices. While that of the Common Toad is high-pitched and musical, the note of Fowler's Toad is nasal, and lower in pitch. Like the voice of the Common Toad, it carries well and may be heard at a considerable distance.

COMMON TREE FROG (*Hyla versicolor*)

The largest tree frog in the Chicago Area is a green or gray stout-bodied frog of moderate size. It is a typical member of the tree frog family in having well-developed disks on the tips of both fingers and toes, by means of which it clings to tree trunks, water plants, or even to the glass walls of a terrarium. It is distinguished by color and size from the only other true *Hyla* in this area, and the dark markings on its back are rarely as regular as are those of the spring peeper.

This species is capable of remarkable color change. A few of the color phases of a single individual are represented in plate I, and another plate illustrating color change in this species may be found in Miss Dickerson's *Frog Book*. Most of the color phases are direct responses to the environment and illustrate an exceptionally

perfect 'concealing coloration.' A curiously constant character of this species is the white marking beneath the eye, which persists through all the color changes of which this species is capable; another constant and distinctive character is the bright orange marked with black of the posterior surfaces of the thighs.

The Common Tree Frog is still found in wooded places around Chicago. Specimens in the museum collection come from northern Indiana, Highland Park, and even from Jackson Park, in the city. Its voice is a pleasing rattled trill, often heard before or at the beginning of a rain.

SPRING PEEPER (*Hyla crucifer*)

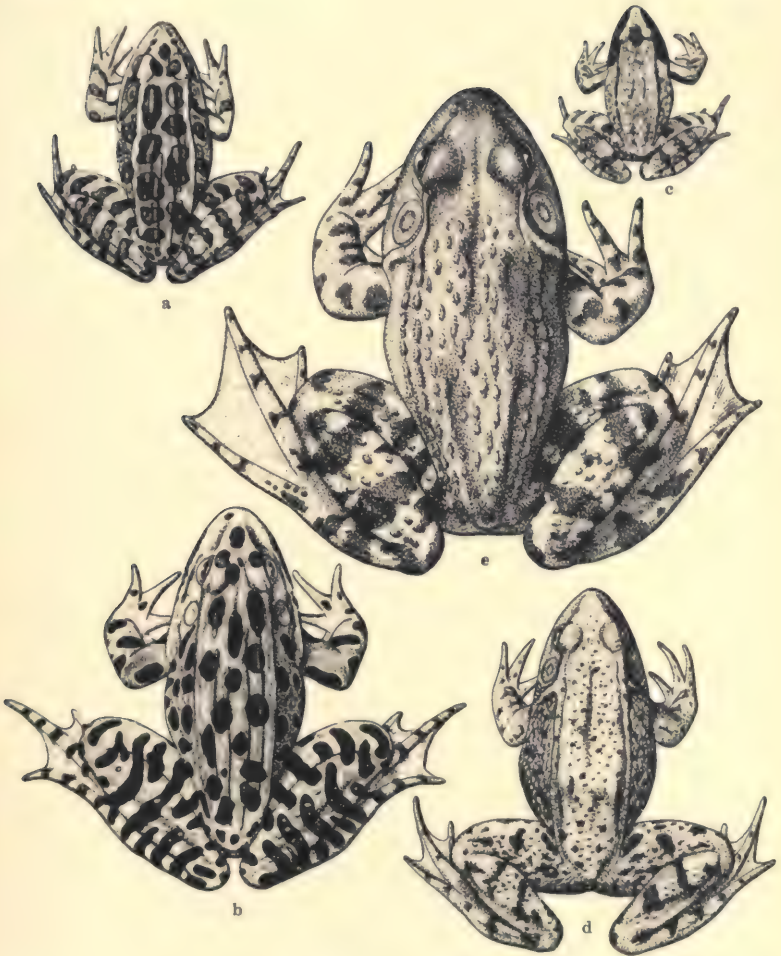
The Spring Peeper is abundant in the Dune Region of northern Indiana, and has been recorded from Beach, north of Waukegan. Its voice has been heard at Homewood, to the southeast of Chicago, but it seems to be absent at Morgan Park.

This tiny frog is one of the earliest species to appear in the spring, and its shrill and clear whistle, often composed of two notes slightly different in pitch, is one of the most pleasing of the night sounds that go to make up the season's frog chorus.

The Spring Peeper is easily recognized by its small size and brownish color, with a more or less regular X-like dark marking on the back. It is of about the same size as the next species in the list, but never has dark lengthwise stripes. The disks of its fingers and toes are well developed.

SWAMP TREE FROG (*Pseudacris triseriatus*)

Wherever a bit of cat-tail marsh persists within the limits of Chicago, the tiny brown striped Swamp Tree Frog is likely to be found. Its voice is the first to be heard in



TRUE FROGS OF THE CHICAGO AREA

- a. The Pickerel Frog. b. The Leopard Frog. c. The Wood Frog. d. The Green Frog.
e. The Bullfrog.

the spring, and when a chorus sings together the sound carries to a great distance. Although everyone has heard this froglet, few have seen it, for it is shy in the daytime and refuses to sing when anyone approaches. At night, with an electric flash-light, it is easy to find the songster. The voice of *Pseudacris* is a rattling croak, more like that of a wooden 'tick-tack' than any other familiar sound, and not at all easy to imitate. It is this frog's croaking which is most widely recognized as proceeding from a frog; but most people who hear it probably associate it with one of the larger common frogs, and would be astonished if they could see what a tiny and peculiar tree frog it is.

"Swamp Tree Frog" seems to be a contradictory name, but it is really a very appropriate one. This group of frogs belongs to the great tree-frog family, but has modified its habits, and taken up residence in the swamps and meadows. The disks of its fingers are less developed than are those of the really tree-climbing tree frogs. As it is the only frog in our area with lengthwise brown stripes, it is easily recognized.

CRICKET FROG (*Acris gryllus*)

This little frog is well named, for both its voice and its sudden leaps are cricket-like. It is easily recognized by the constant presence of a triangular marking between the eyes, with the point directed backward, while other features of the coloration are very variable. Although not as rough as the toad's skin, the Cricket Frog's skin is raised into low rounded warts, and this, together with its color pattern, its very long hind legs, and its fully webbed toes, distinguishes it from other Chicago frogs. It is of about the same size as the Swamp Tree Frog and the Spring Peeper.

The Cricket Frog comes out of its hibernating places in the mud, as soon as the ice is off the ponds, and often as soon as there is a little open water at the edge of the ice.

It does not begin to sing however, until the beginning of warm weather, and its rapid croak (like cracking two small stones together under water) does not begin until later in the season. Its voice does not carry far and it is necessary to visit the ponds in order to hear it well.

Like the Swamp Tree Frog, the Cricket Frog is a member of the tree-frog family that has given up tree-climbing. *Pseudacris*, however, is an inhabitant of cat-tail marshes and ranges into the fields and meadows in summer, while *Acris* is a frog of open ponds and sluggish streams and does not wander far from them. As in the former species, the disks at the tips of the fingers and toes are much reduced, but they may still be distinguished by attentive examination.

LEOPARD FROG (*Rana pipiens*)

The common spotted frog of our ponds and meadows is usually called "the leopard frog" in published accounts. It is by far the most abundant of the true frogs in our area, and is the one best known to fishermen as the ideal bait for black bass.

This frog is shipped into Chicago from the northwest (Iowa, South Dakota, and Minnesota) in very large numbers. The larger specimens are used for food while during the fishing season the medium sized ones are sold for bait.

It comes out of hibernation very early, and does not sing until some days later. Its voice is a low croaking sound, not carrying more than a few rods from the ponds where it sings.

In late spring and throughout the summer this frog ranges through the meadows in search of its insect food, often far from water. It returns to the ponds or swamps to hibernate. In midsummer the young frogs of this species, just changed from the tadpole stage, may be exceedingly abundant in the neighborhood of ponds and swamps.



SWAMP TREE FROG

The male is singing with throat greatly distended. The female has been attracted by the song.
Photograph by C. J. Albrecht.

PICKEREL FROG (*Rana palustris*)

The Pickerel Frog is spotted like the Leopard Frog, but its spots are usually larger, nearly square, and in two distinct rows along the sides of the back. The inside surfaces of the thighs are bright yellow or orange when the frog is alive.

As far as known, it occurs in the Chicago area only in northern Indiana, where it is abundant along the little Calumet River, south of the dunes.

Its voice differs strikingly from that of the Leopard Frog, being a prolonged rather uniform snoring sound, but it is even lower in pitch and has less carrying power, so that it is rarely heard.

WOOD FROG (*Rana cantabrigensis*)

The Western Wood Frog is easily recognized, in our area, by its pale brown color, unspotted back, and black cheeks. It is known to me only from the Indiana dune region and from Highland Park, Illinois.

Nothing is known of the habits of this frog in the Chicago area. They are doubtless similar to those of the Eastern Wood Frog, which breeds very early in the spring. Except at the breeding season, it is found in shady woods, often far from water.

GREEN FROG (*Rana clamitans*)

The Green Frog is decidedly more of a water frog than the Leopard Frog, and does not wander far from water. It comes out of hibernation later and breeds much later than any of the other Chicago frogs except the Bullfrog.

The voice of the green frog is a pleasing 'ktung' or 'ktung-ktung,' like the plucked string of a 'cello.

The tadpoles of the Green Frog grow larger than those of the Leopard Frog, and require a full year to mature. They pass the winter under the ice and change into the frog stage late in the spring.

The only frog likely to be mistaken for the Green Frog in this region is the Bullfrog. The Green Frog differs from its larger relative in having a glandular ridge or skin fold on each side of the back.

BULLFROG (*Rana catesbeiana*)

The appearance and voice of the Bullfrog indicate that the breeding seasons of the other species of frogs are over. The bass voice of this species doubtless gives it its name. The 'jug-o-rum' or 'brr-wum' of this frog is not likely to be forgotten by anyone who has heard it.

Bullfrogs have been reported in this region only from northern Indiana and from Willow Springs and Waukegan in Illinois. It is a much more abundant species in the south, and supplies the frogs' legs for the table in the Gulf States. Our northern Bullfrogs do not grow as large as southern specimens, which may reach a body-length of eight inches. The largest local Bullfrog in Field Museum's collections measures five and a half inches in length of body.

The tadpoles of the Bullfrog grow even larger than those of the Green Frog and require three seasons to complete their growth. Newly transformed frogs of this species measure about two inches in length of body.

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